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Ethylene terephthalate vinylidene chloride coated container blanks - used as heat-sealable fruit juice containers for retaining flavours and aromas
C87-115784 R(BE CH DE FR GB IT LI NL SE)

A(4-E6, 5-E1D1, 12-P6B)

A one-piece, foldable, laminated blank forming a sealed, liq. container comprises

(a) a layer of bulk material of predetermined thickness;

(b) a first uniform coating of polyester of predetermined thickness on the outside of the bulk material;

(c) a second uniform coating of polyester of predetermined thickness on the inner surface of the bulk material; and

(d) a uniform coating of PVdC on selected areas of the second polyester coating.

An oil, grease and solvent resistant, heat-sealed container is also claimed which is formed from the one-piece foldable, laminated paperboard blank comprises four side-wall panels forming a rectangular cross-section tube with fold-in top and bottom closures.

USE/ADVANTAGES

The containers are suitable for e.g. fruit juices, prolonging their shelf-life without affecting flavour essences and aromas.

EMBODIMENTS

Pref. the layer of bulk material is 0.0123-0.0254, (0.022) inches thick, consisting of kraft paperboard (pref), foam plastics, synth or composite paperboard.

The first layer of polyester is 0.0005-0.0010, and the second layer, 0.001-0.003 inches thick, both layers consisting of amorphous polyethylene terephthalate (PET).

The PVdC layer is between 0.0003-0.0010 inches thick and may be applied by conventional printing techniques.

PREFERRED BLANK

A claimed blank comprises

(a) an approx. 0.022 inches thick layer of kraft paperboard;

(b) an 0.0075 (sic) inches thick outer layer of (PET);

(c) a second, inner layer of (PET) 0.002 inches thick; and

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(d) an 0.0005 inches thick layer of PVdC secured to the second layer of PET.

The PVdC layer pref. only covers the area exposed to the liq. contents of the container formed form the blank.

CONTAINER

Pref. the container comprises

(a) four side walls forming a rectangular cross-section tubular body with fold-in top and bottom closure;

(b) an 0.022 (0.0123-0.0254) inches thick paperboard thermally bonded between inner and outer layers, 0.0015-(0.0005-0.003) inches thick, of amorphous PET; and

(c) an 0.005 (0.0003-0.0010) inch thick layer of PVdC secured to the inner PET layer.

The PVdC layer is applied in a pattern conforming to the inner surfaces of the container exposed to the liq. contents leaving only the PET coated areas for sealing to each other.

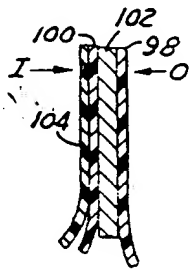
EXAMPLE

A fruit juice container was produced from a blank sepd. into three general groups by score lines comprising the top, body and bottom closure groups. The body group is divided into side wall panels and a side seam flap , for heat-sealing to the side wall panels before the container is opened and filled.

The cross section through the side wall from outside to the interior comprises a layer of PET (98) on the main body layer (102) of kraft paperboard, foam plastic etc., with a further layer (100) of PET on which a layer (104) of PVdC is printed in a pattern avoiding the areas to be heat-sealed.

The PET layers have durable heat-seals, without supplementary adhesives and the PVdC layer has good flavour retention and gas (O_2) barrier properties. (5pp1677 WRDwgNo4/4)

(E) ISR: No Search Report.



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(54) Laminated paperboard container and blank for constructing same.

(57) There is disclosed a heat sealable container for fruit juices, and a blank for constructing same, having a laminated wall construction of suitable oxygen resistant barriers or layers which are compatible with one another insofar as bonding and sealing are concerned. Such wall construction includes a central layer of kraft paperboard, with inner and outer layers of a suitable polyester, and an innermost selectively printed layer of polyvinylidene chloride.

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LAMINATED PAPERBOARD CONTAINER AND BLANK FOR CONSTRUCTING SAME

This invention relates generally to paperboard containers and, more particularly to a laminated wall construction for same, including oxygen resistant barriers or layers.

Various industries have found that central packaging for distant markets is a beneficial approach in their business activity and can assist them in developing strong market bases. With the increased emphasis on volume producing and marketing, many centers of population in reference to a product market base may extend across international boundaries. Thus, out of both necessity and convenience, situations have developed where essential production marketing areas extend across vast market areas. Hence, longer shelf life for difficult to contain liquids, such as fruit juices and products, is needed so that producers and suppliers can provide uniform top quality merchandise throughout their areas of distribution.

It is well known to include a layer of aluminum foil, which generally serves as a means of preventing oxygen from penetrating through the walls of a paperboard container when the latter contains fruit juices. However, aluminum as a barrier is expensive and subject to cracking at score lines.

It is also well known to coat the barrier layer with a heat-sealable material, such as low density polyethylene. Such a coating tends to scavenge flavor essences and aromas from various fruit juices.

In view of the above described characteristics of aluminum and low density polyethylene, a general object of the invention is to provide an improved, economical paperboard container which is capable of improving the shelf life of fruit juices.

Another object of the invention is to provide a container having an improved wall construction of suitable barriers or layers which avoid the above described negative characteristics, and which are compatible with one another insofar as bonding and sealing are concerned.

A further object of the invention is to provide a paperboard container for retaining flavors and aromas, while efficiently preventing the penetration of oxygen, wherein the wall construction includes a suitable combination of layers of polyester and polyvinylidene chloride.

Still another object of the invention is to provide such a container wherein the polyester is an amorphous polyethylene terapthalate.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a layout view of the inside surface of a container blank body, to which the present invention could be adapted;

Figure 2 is a flat side seamed blank made from the container blank shown in Figure 1, and showing the outside surface thereof;

Figure 3 is a perspective view of a container fabricated from the blanks shown in Figures 1 and 2; and

Figure 4 is a fragmentary cross-sectional view through a side panel taken on line 4-4 of Figure 3, and looking in the direction of the arrows.

Referring now to the drawings in greater detail, Figure 1 illustrates the inside surface of a container blank 10. The container blank 10 is separated into three general groups by staggered score lines 12 and 14. The group above the staggered score line 12 is referred to as the top closure group 16. The group between staggered score lines 12 and 14 is referred to as the body group 18. The group below the staggered score line 14 is referred to as the bottom closure group 20. The container blank 10 is defined on its sides by side edges 22 and 24 and is separated vertically by a series of score lines 26, 28, 30 and 32. The score lines 26, 28, 30 and 32 divide the body group 18 into side wall panels 34, 36, 38 and 40, with the edge 22 and the score line 26 defining a side seam flap 42.

The top closure group 16 is mounted on the upper end of body group 18. Triangular end panels 44 and 46 are mounted to upper ends of the side wall panels 34 and 38, respectively. The triangular end panel 44 has a pair of adjacent fold-back panels 48 and 50 mounted on its upper side and the triangular end panel 46 has a pair of fold-back end panels 52 and 54 mounted on its upper sides. A pair of inner rib panels 56 and 58 are mounted adjacent the fold-back panels 48 and 50, respectively. A pair of inner rib panels 60 and 62 are mounted adjacent the fold-back panels 52 and 54, respectively.

A pair of roof panels 64 and 66 are mounted to the body group 18 at the upper end of the side wall panels 36 and 40, respectively. A top edge member 72 defines the upper free end of top closure group 16. A complete description of the top closure group 16 is not necessary to understand the principles of the present invention. However, reference is made to U.S. Patent 3,270,940 which issued September 6, 1966 for a complete description of a top closure group similar to top closure group 16.

The bottom closure group 20 is mounted on the lower end of body group 18. A flap 74 and a fold-over flap 76 are mounted at the lower ends of the side wall panels 36 and 40, respectively, along

the staggered score line 14. A first minor flap 78 and second minor flap 80 are mounted at the bottom of the side wall panels 34 and 38, respectively, along the staggered score line 14. A pair of fold-back panels 82 and 84 connect the first minor flap 78 to the side seam flap 42 and the flap 74, respectively. The second minor flap 80 is connected to the flap 74 and the fold-over flap 76 by fold-back panels 86 and 88, respectively. A bottom edge 90 defines the free end of the bottom closure group 20. A fold-under flap 92 is connected by a score line 94 on the edge 90 at the center of the flap 74 for a purpose to be described.

When the container blank 10 is being prepared for assembly as a container it will be side seamed by having the triangular end panel 44 and its associated panel segments, the side wall panel 34 and the first minor flap 78 and its associated fold-back panels 82 and 84, along with the side seam flap 42, folded about the score line 28, moving their inside surfaces into contact with the inside surfaces of the roof panel 64, the side wall panel 36 and the flap 74, with the side seam flap 42's inside surface extending past the score line 30.

The roof panel 66, the side wall panel 40 and the fold-over flap 76 will be rotated about the score line 32 so their inside surfaces will move toward the inside surface of the triangular end panel 46, the side wall panel 38 and the second minor flap 80 and the associated fold-back panels 86 and 88. The side edge 24 will then be substantially aligned with the score line 30 and its associated edge portion will be aligned with and in contact with the outside surface of the side seam flap 42. The outside surface of side seam flap 42 is secured to the inside surface of the various panel and flap members being positioned along the side edge 24. This can be accomplished in many ways. One of the preferred methods is heat sealing which will establish a surface bond between the above stated members. The container blank 10 can then be opened into tubular form.

In normal production operations the bottom closure group 20 will be closed and sealed, the contents will be passed into the tubular container and then the top closure group 16 will be closed and sealed, as illustrated in Figure 3. The forming of the side seam blank and the closing of the top closure group is covered in detail in the above mentioned U.S. Patent 3,270,940. The forming of the bottom closure group 20 is covered in detail in U.S. Patent Nos. 3,120,335 and 4,341,340. The fold-under flap 92, folded along the score line 94 serves to eliminate a raw edge at the center of the four folded and sealed bottom closure panels, substantially as shown and described in U.S. Patent No. 3,294,310.

Referring now to Figure 4, wherein a cross-sectional view of the wall of the container is represented, an arrow I identifies the inside surface of the container represented as 96, and an arrow O identifies the outside surface of the container 96. The identification of the progressive layers from the outside to the inside is as follows. Layers 98 and 100 each consist of a suitable polyester, such as an amorphous polyethylene terapthalate, on respective surfaces of a central layer 102, which is the bulk or main body layer, and which may consist of a kraft paperboard, foam plastic, a synthetic paperboard, or a composite paperboard. The amorphous polyethylene terapthalate has been selected for its superior heat sealing characteristics. The extreme inside layer 104 is a polyvinylidene chloride. The latter is applied to the layer 100 by conventional printing techniques. Accordingly, it is possible to apply the polyvinylidene chloride coating in a precise pattern, avoiding those areas of the blank which are involved in the heat sealing operation. The preferred pattern is shown by the cross hatched lines on Figure 1. The end result is a superior and economical container where the durability and heat seal characteristics of the amorphous polyethylene terapthalate, and the flavor retention and barrier properties of polyvinylidene chloride are both fully utilized without having to use supplementary adhesives for laminating or additional coatings for heat sealing.

Figure 4 is not drawn to scale, and the following are examples of ranges of thicknesses of the respective layers which could be used in a practical embodiment of a container in accordance to the invention:

layer 98 = .0005" - .0010" (.0075" preferred)
layer 100 = .001" - .003" (.0020" preferred)
layer 102 = .0123" - .0254" (varies with container size)
layer 104 = .0003" - .0010" (.0005" preferred)

The thickness range for the layer 102 applies to the range of standard container sizes, i.e., half pint, pint, quart, half gallon, and gallon. For the popular half gallon size, for example, the preferred thickness is .022", with a recommended range of .020" - .024".

Along with the inclusion of the above described special layers, it may be beneficial for the inner cut edge 22 be "skived" by some one of several known methods, such as that shown and described in U.S. Patent No. 4,254,693, resulting in a carton edge structure, as shown in U.S. Patent No. 4,239,150, or folded-over, as shown in U.S. Patent No. 3,294,310. One of these techniques, coupled with the folded-under flap 92, serve to eliminate raw cut edges from being exposed to the liquid contents.

It should be apparent that the invention provides an improved paperboard package for carrying fruit juices.

It should also be apparent that the respective layers of materials described above may be varied in thickness independently of the other layers to suit particular liquid packaging applications.

Claims

1. A one-piece foldable, laminated blank for forming a sealed liquid container, said blank comprising:

a) a layer of bulk material having a predetermined thickness;

b) a first layer of a suitable polyester having a predetermined thickness and forming a uniform coating on the outer surface of the layer of bulk material;

c) a second layer of a suitable polyester having a predetermined thickness and forming a uniform coating on the inner surface of the layer of bulk material; and

d) a layer of polyvinylidene chloride having a predetermined thickness and forming a uniform outer coating on selected areas of the second layer of polyester.

2. A laminated blank according to claim 1, wherein the layer of bulk material is from .0123" to .0254" thick.

3. A laminated blank according to claim 1 or claim 2, wherein the bulk material is one of kraft paperboard, foam plastics, synthetic paperboard, and composite paperboard.

4. A laminated blank according to any one of claims 1 to 3, wherein the layer of bulk material is the order of .022 inches thick.

5. A laminated blank according to any one of claims 1 to 4, wherein the first layer of a suitable polyester is between .0005" and .0010" thick.

6. A laminated blank according to any one of claims 1 to 5, wherein said second layer of a suitable polyester is between .001" and .003" thick.

7. A laminated blank according to claim 6, wherein the layer of polyester consists of an amorphous poylethylene terapthalate.

8. A laminated blank according to any one of claims 1 to 7, wherein said layer of polyvinylidene chloride is between .0003" and .0010" thick.

9. A laminated blank according to any one of claims 1 to 8, wherein said layer of polyvinylidene chloride is applied to said second layer of a suitable polyester by conventional printing techniques.

10. A one-piece foldable, laminated blank for forming a sealed liquid container, said blank comprising:

a) a layer of kraft paperboard material on the order of .022 inches thick,

b) a first layer of an amorphous polyethylene terpthalate on the order of .0075 inches thick forming a uniform coating on one surface of the layer of kraft paperboard material,

c) a second layer of an amorphous polyethylene terpthalate on the order of .002 inches thick formed uniformly on the other surface of the layer of kraft paperboard material; and

d) a layer of polyvinylidene chloride .0005 inches thick secured to the second layer of an amorphous polyethylene terapthalate.

11. A laminated blank according to claim 10, wherein the layer of polyvinylidene chloride covers only the area which is adapted to be exposed to the liquid contents of the container formed from the blank.

12. An oil, grear, and solvent resistant, heat-sealed container formed from a one-piece foldable laminated blank of sheet material, said container comprising four side wall panels forming a tubular body of rectangular cross section having a fold-in top closure and a fold-in bottom closure; said sheet material comprising first and second thicknesses of an amorphous polyethylene terapthalate thermally bonded to opposite sides of a third thickness of paperboard, and a fourth thickness of polyvinylidene chloride bonded to said second thickness of an amorphous polyethylene teraphthalate.

13. An oil, grease, and solvent resistant, heat-sealed container formed from a one-piece foldable laminated blank of paperboard, said container comprising:

a) four side wall panels forming a tubular body of rectangular cross section having fold-in top and bottom closures;

b) said container being formed from paperboard having a thickness on the order of .022 inches and thermally bonded between inner and outer layers of an amorphous polyethylene terapthalate on the order of .0015" thick; and

c) a layer of polyvinylidene chloride on the order of .0005" thick secured to the inner layer of polyethylene terapthalate.

14. A container according to claim 13, wherein the range of the layer of paperboard is .0123" - .0254" thickness; the range of each of the layers of polyethylene terapthalate is .0005" - .003" thickness; and the range of the layer of polyvinylidene chloride is .0003" - .0010" thickness.

15. A container according to claim 13, wherein the layer of polyvinylidene chloride is applied in a predetermined pattern so as to conform only to the inner surfaces of the container which are exposed to the liquid contents, leaving only polyethylene terapthalate coated areas for sealing to one another.

FIG.1

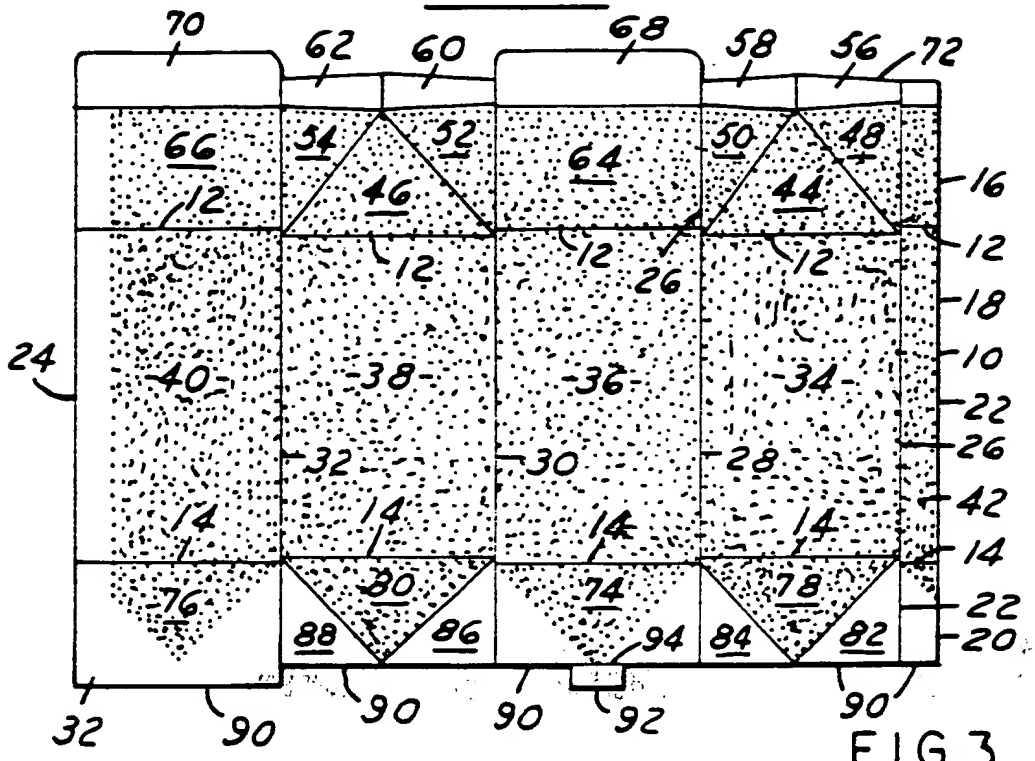

FIG.2

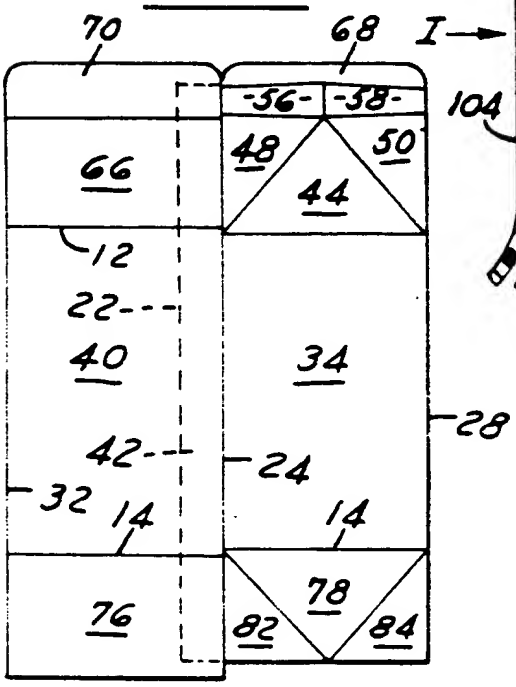

FIG.4

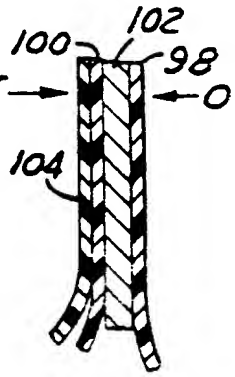

FIG.3